

REMARKS/ARGUMENTS

Applicant responds herein to the Office Action dated June 4, 2007.

The applicant's attorneys appreciate the Examiner's thorough search and remarks.

Claim 14 was rejected under 35 U.S.C. §112, second and fourth paragraphs. Claims 11-13 and 15 were rejected under 35 U.S.C. §103(a) as being obvious over Namiki (U.S. Publication No. 2001/0050802) in view of Zarris (U.S. Publication No. 2002/0085268). Claim 16 was rejected under 35 U.S.C. §103(a) as being obvious over Namiki in view of Zarris and further in view of Grubb (U.S. Publication No. 2002/0067539). Reconsideration is requested.

Regarding the rejection of dependent claim 14 under 35 U.S.C. §112, second paragraph, the Examiner argues that claim 14 "says that spares are provided for the first and second pumps," which "renders the scope of claim 14 in question" (e.g., see, Office Action page 3, top). However, applicant respectfully disagrees. Claim 14, which depends upon claim 11, recites, *inter alia*, "said first and second light sources emit light at first and second wavelengths, and at least one spare pumping light source is provided for each of said first and second wavelengths." Thus, as required by claim 14, the first light sources and the second light sources emit light at first and second wavelengths. This is an additional limitation which is not required by claim 11. Further, with regard to the spares, claim 11 recites, *inter alia*, "providing one or more spare pumping light sources only in said plurality of second light sources." Thus, as set forth by claims 11 and 14, spare pumping light sources are provided only in the second light sources, and at least one spare pumping light source is provided for each of these (i.e., the first and second) wavelengths in the second light sources. These limitations are fully supported by the Specification. For example, see, page 19 of the Specification and FIGs. 6-7 where spare pumping light sources which provide spare pumping light at corresponding wavelengths of λ_1 and λ_2 are shown and described. In light of the above, the scope of claim 14 is clearly set forth. Reconsideration is requested.

Regarding the rejection of claim 14 under 35 U.S.C. §112, fourth paragraph, as stated above, claim 14 recites additional limitations which are not required by claim 11. Accordingly, claim 14 further limits claim 11. Reconsideration is requested.

Regarding the rejection of independent claim 11 under 35 U.S.C. §103(a), according to an embodiment of the present invention, as recited by claim 11, an optical transmission system includes first and second light sources for Raman amplification. The first and second light sources

are used to amplify transmitted signal light. As recited by claim 11, only the second light sources include the spare pumping light sources, which are operated to restore deteriorated light which was amplified by the first light source. Thus, light which was transmitted by the first light source (which the Examiner equates with an “amplifier node” at page 5 of the Office Action), is restored using light from the second light source. Further, as acknowledged by the Examiner, neither Namiki nor Zarris teaches or suggests pumping from a plurality of amplifier nodes (e.g. see, Office Action, Page 5, middle). Accordingly, Namiki and Zarris cannot teach both the first and second light sources, as recited by claim 11.

Moreover, as recited by claim 11, the spare pumping light sources are operated only when required to restore deteriorated light which was transmitted by the first light source. In the Office Action, the Examiner states that Namiki teaches, in paragraph 169, “said spare pumping light sources being operated only when required to restore deteriorated signal light” (e.g., see, Office Action, Page 4). However, with reference to paragraphs 163 and 169, Namiki teaches a pumping device (i.e., “an amplifier node”) using “spare” pump lasers which operate at different frequencies from adjacent pump lasers in the same pumping device and which change the bandwidth at the pumping device (e.g., see, Namiki, paragraphs 163 and 167, and FIGs. 17, 18, 23, 26, and 29, and Office Action, page 5). Namiki teaches these “spare” pump lasers may be used to achieve a target profile and, thus, may be turned on or off as necessary. For example, with reference to FIG. 23, pump 7 is not used and is used with reference to FIG. 29. Thus, according to Namiki, the spare pumps may be used as necessary to achieve a target profile. However, this does not teach or suggest “said spare pumping light sources being operated only when required to restore deteriorated signal light,” as required by claim 11. Further, this deficiency is not cured by Zarris which is discussed below.

Moreover, with respect to Zarris, the Examiner states that Zarris, in paragraph 7, teaches providing one or more spare pumping light sources only in said plurality of second light sources for Raman amplification, the number of spare pumping light sources being less than the number of said first light sources, as recited by claim 11. However, with reference to paragraph 7, Zarris teaches prior art wideband Raman optical amplifiers, such as is shown in FIG. 1, have a number of drawbacks resulting from the fact that more than one pump source is required and states that the number of redundant pumps may be as high as the number of working pumps which in turn exaggerates the problems” (emphasis added). Accordingly, Zarris teaches a wideband optical

amplifier using preferably one pump source of pump radiation (e.g., see, Zarris paragraphs 4, 7, and 14). Further, although, Zarris discloses “redundant pumps” (e.g., see, Zarris paragraphs 7 and 11), Zarris is silent on a location of these pumps. Moreover, as stated above, the Examiner acknowledges that Zarris does not teach or suggest pumping from a plurality of amplifier nodes. Accordingly, Zarris cannot teach or suggest “providing one or more spare pumping light sources only in said plurality of second light sources for Raman amplification, and that the number of spare pumping light sources being less than the number of said first light sources,” as required by claim 11.

Further, the Examiner states that Zarris teaches “a number of said first light sources not having spare pumping light sources, intervening between two of said second light sources being determined by a permissible failure rate of the optical pumping system,” and argues that Zarris teaches “there are disadvantages of having all pumps have a backup,” and that “both Zarris and Namiki teach that adjacent pumps can pick up the slack for a failed pump,” and that Zarris teaches “if higher reliability is needed more pumps are needed” (e.g., see, Office Action, page 4, bottom-page 5, top). However, although Zarris teaches using redundant pumps, Zarris is silent as to the location of these redundant pumps. Further, Zarris does not teach or suggest a permissible failure rate of the optical transmission system. Accordingly, for at least the above-stated reasons, Zarris and Namiki, or the combination thereof, fails to teach or suggest “providing one or more spare pumping light sources only in said plurality of second light sources for Raman amplification, the number of said second light sources being less than the number of said first light sources, a number of said first light sources not having spare pumping light sources, intervening between two of said second light sources being determined by a permissible failure rate of the optical transmission system,” as required by claim 11.

Accordingly, as Zarris does not cure the deficiencies of Namiki, the combination of Namiki and Zarris, cannot render claim 11 obvious. Reconsideration is requested.

With regard to the rejection of claim 16 under 35 U.S.C. §103(a), claim 16 includes similar recitations as those contained in claim 11. Accordingly, as Grubb, which teaches that pump booster power can be split (e.g., by using a distributor) and used to amplify pump power being provided to multiple amplifier stages disposed along one or more transmission fibers (e.g., see, Grubb, paragraphs 19 and 53), does not cure the deficiencies of Namiki and Zarris, claim 16 is allowable for at least the above-stated reasons.

Claims 12-15 are directly dependent upon independent claim 11 and are allowable over Namiki and Zarris for at least the same reasons recited above with respect to the allowability of independent claim 11.

Accordingly, the Examiner is respectfully requested to reconsider the application, allow the claims and pass this case to issue.

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